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10/593,448

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Hagen Spies

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EXAMINER

BITAR, NANCY

ART UNIT

PAPER NUMBER

2624

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                     |  |
|------------------------------|--------------------------------------|-------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/593,448 | <b>Applicant(s)</b><br>SPIES ET AL. |  |
|                              | <b>Examiner</b><br>NANCY BITAR       | <b>Art Unit</b><br>2624             |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 9/19/2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/19/07, 1/19/07, 9/19/06</u> .                               | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO “Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility” (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in Sec. 101.

... a signal does not fall within one of the four statutory classes of Sec. 101.

... signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of Sec. 101.

1. Claim 17 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim(s) 17 define a “propagated signal” with descriptive material. While “functional descriptive material” may be claimed as a statutory product (i.e., a “manufacture”) when embodied on a tangible computer readable medium, a “propagated signal” embodying that same functional descriptive material is neither a process nor a product (i.e., a tangible “thing”) and therefore does not fall within one of the four statutory classes of § 101. Rather, “signal” is a form of energy, in the absence of any physical structure or tangible material
2. 35 U.S.C. 101 reads as follows:

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Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

3. Claim(s) 15-16 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 15 defines a "computer program" embodying functional descriptive material. Claim 16 defines a "storage medium" embodying functional descriptive material. However, the claim does not define a computer-readable medium or memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since

use of technology permits the function of the descriptive material to be realized” – Guidelines Annex IV). That is, the scope of the presently claimed “a computer program and a storage medium” can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody the program on “computer-readable medium” or equivalent in order to make the claim statutory. Any amendment to the claim should be commensurate with its corresponding disclosure.

#### **Examiner Notes**

4. Examiner cites particular columns and line numbers in the references as applied to the claims below for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner

#### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Peters (US 5,715,334).

As to claims 1, 18 and 19, Peters teaches enhancing a first CT image composed of a plurality of elements, each having an intensity value in Hounsfield units indicative of a tissue type (An "image information enhancement" technique for processing digital images is presented, wherein enhancement of image detail contrast is accomplished by adding a differential hysteresis pattern to a digital image. Column 1, line 57-column 2, lines 38), the method comprising: receiving said first CT image ( Ct image, column 30, line 38) , providing, by enhancement processing based on said first CT image, a plurality of copies of said first CT image ( figure 26, column 33, lines 42-column 34, lines 63) , said enhancement processing being performed with respect to predetermined intensity value ranges, and combining said plurality of copies of said first CT image with said first CT image (high precision hysteresis images maintain all the characteristics of hysteresis lines, i.e., "pixel-accuracy" of preserved intensity components which were larger than the hysteresis range, by maintaining their spatial position and their intensity character, but reducing their individual maximum intensity range by as much as one half the cursor range; column 33, lines 42-column 34, lines 9; note that in claim 1, Peters teaches that the differential image data array is added to the first image data array) , whereby an enhanced CT image is provided, said combining being based on a classification with respect to intensity values of regions within said first CT image and said plurality of copies of said first CT image (FIG. 30A shows that a CT cross section

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scaled to 8-bit image revealed little data. FIG. 30B shows that differential hysteresis image for a large differential hysteresis range of 8-bit improved the overall structural contrasts. FIG. 30C shows that the enhanced hysteresis intensity details reveals details in all tissues, i.e., the liver region showed a dramatic increase of fine structures. FIG. 30D shows an improved image with enriched selected intensity details FIG. 30E shows that the highest contrast resolution hysteresis detail patterns were found below the relatively small noise component (1% IR). Although noisy, the liver fine structure indicated a zoning and ultra structures at the level of single canaliculated and vessels. FIG. 30F shows that an improved image was obtained by enrichment of the spatial hysteresis details, column 36, lines 57-column 37, lines 23; claim 1).

As to claims 2-4, Peters teaches receiving an indication of said predetermined value ranges and associating said predetermined intensity value ranges with said plurality of copies of said first CT image (note that in figure 26, it is clear that a plurality of processed copies of the first CT image are generated wherein the differential images with different scaling are interpreted as one image see figures 30A-F.) Moreover, Peters teaches the enhancement processing is adaptive to a local structure defined by at least some of said plurality of elements and said local structure is defined by a group of elements whose intensity values are within said predetermined intensity value ranges (a novel method of image information analysis and classification based on the concept that any image communicates information only through image contrasts which are intensity variations between certain pixel arrays within the total data matrix. An area of certain contrast is defined by the differences between its average intensity and the

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surrounding intensity irrespectively of the overall intensity variations (background). The new detail filter of this invention provides the only tool available for selecting such local intensity variations independently from the other intensity variations within the full data matrix through only one parameter which is the intensity range (equal to cursor width or significant intensity range) ; column 7, lines 1-6).

As to claim 5, Peters teaches the method of claim 1, wherein said enhancement processing comprises applying a non-linear filter to said plurality of copies of said first CT image ( The smoothing technique of this invention comprises a two dimensional digital hysteresis filter which utilizes a variable, automatically adjusting "two-dimensional mask". As a result, the filter is independent of the image size and content and cannot alter the size of any structural (significant intensity) features, even if they are as small as only one pixel in size, column 3, lines 46-60) .

As to claim 6, Peters teaches the method of claim 1, wherein said enhancement processing is selected from a group consisting of a noise reduction using a low pass filter, a contrast enhancement using unsharp masking, a rank filtering, an adaptive filtering, a mean-shift filtering, a variational method, a multiband technique and a wavelet technique (In general, "detail enhancement" refers to an enhancement of the contrast of image details and must include the spatial details as well as the intensity details in order to maintain the image character (image accuracy), column 5, lines 10-43).

The limitation of claim 7 has been addressed above.



As to claim 8, Peters teaches the method of claim 7, further comprising prioritizing said first CT image and said plurality of copies of said first CT image, whereby an element of a CT image having a higher priority is included in the enhanced CT image and a correspondingly located element of a CT image having a lower priority is excluded from the enhanced CT image (figure 6; column 31, lines 42-column 32, lines 64).

As to claim 9 and 10, Peters teaches smoothing and normalizing said region masks (smoothed images, column 17, lines 32-column 18-lines 41).

As to claim 12, Peters teaches method of claim 1, wherein said first CT image is selected from a group consisting of a two-dimensional array, a three-dimensional array and a four-dimensional array (digitized image data array comprises a multi-dimensional data array, claim 16)

The limitation of dependent claims 11-14 has been addressed in column 14, line 65-column 15, lines 62 and column 33, line 42-column 34lines 63)

Claims 15-17 differ from claim 1Y only in that claim 1 is a method claim whereas; claims 15-17 are carried in a computer medium. Peters teaches the implementation of the image information enhancement technique in a computer program (column 17, lines 30-59). Thus, claims 15-17 are analyzed as previously discussed with respect to the claims above.

### **Conclusion**

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NANCY BITAR whose telephone number is

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(571)270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jinge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jingge Wu/  
Supervisory Patent Examiner, Art Unit 2624

Nancy Bitar

9/29/2008